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LABORATORY TESTS OF TOXICITY OF SOME ORGANIC COMPOUNDS TO THE EUROPEAN CORN BORER, JANUARY—MARCH 1944

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This report contains results of laboratory tests with recently decoded organic compounds showing their toxicity to newly hatched larvae of the European corn borer. Tests with other compounds against these larvae are reported in publications E-557 and E-612 of this Bureau.

The care and handling of larvae, moths, and eggs for these tests and the technique employed in conducting them are described in an earlier report. All tests were run for 48 hours. Cauliflower leaves were used as the feeding medium.

Materials were tested as sprays at a strength of 4 pounds per 100 gallons of water containing 1/3 pound of Areskap (sodium monosulfonate of butylphenylphenol) as a wetting agent. Those materials showing high mortality with little or no feeding were retested at either 2 pounds or 1 pound per 100 gallons of water, or both.

Only two compounds gave high mortality when the concentration was reduced to 2 pounds per 100 gallons, and only one, 4,6-dinitro-o-cresol ether, continued to give high mortality when tested at 1 pound per 100 gallons.

As this material is not ground readily by itself, various mixtures with talc and pyrophyllite were prepared and tested against the borer. Concentrations as low as 1/4 pound of active agent per 100 gallons of water gave 100 percent mortality or nearly so in repeated tests. The degree of fineness with which the material was ground influenced the mortality. When such small insects as newly hatched European corn borer larvae are being used for tests, the active agent must be finely ground for ingestion and for the material to be carried between the appressed leaves where the borers feed in the field. Since approximately 99 percent of the borers killed by derris spray treatments in the field die when they are in the first or second instar, the necessity for small particle size of the active agent can readily be seen.

The results of these tests are given in table 1.

Table 1.—Results of laboratory tests of some organic compounds against newly hatched European corn borer larvae.

Compound	Larvae used in treatment 1/	Average mortality of larvae		Amount of feeding 2/
		Treated	Not treated	
	Number	Percent	Percent	
Tests at 4 pounds per 100 gallons				
4,6-Dinitro-o-cresol ethyl ether $(NO_2)_2(CH_3)C_6H_2OC_2H_5$	112	100.0	0.3	0
Ethylidenebisbenzamide $CH_3CH(NHCOC_6H_5)_2$	227	98.1	.8	0 to +
Salicylaldehyde 4-phenyl-3-thiosemicarbazone $C_6H_4(OH)CH:NNHCSNHC_6H_5$	269	95.0	2.4	0 to +
1-Benzoylthiourea $C_6H_5CONHCSNH_2$	265	83.3	2.4	0 to +
4-Phenylthiosemicarbazide $C_6H_5NHCSNHNH_2$	291	80.9	2.4	+
p,p'-Dichlorophenyl sulfone $(C_6H_4Cl)_2SO_2$	78	68.6	4.8	0 to ++
Cinnamaldehyde 4-phenyl-3-thiosemicarbazone $C_6H_5CH:CHCH:NNHCSNHC_6H_5$	201	67.8	2.5	+
d-Camphor oxime $C_{10}H_{17}NO$	90	40.0	2.1	++
Acetylurea $CH_3CONHCONH_2$	229	19.4	.8	+++
o-Veratraldehyde oxime $(CH_3O)_2C_6H_3CH:NOH$	129	7.5	1.2	++
Acetonylacetone dioxime $CH_3C(:NOH)CH_2C(:NOH)CH_3$	70	5.9	4.8	+++
p-Chlorobenzophenone $C_6H_4ClCOC_6H_5$	192	3.1	1.6	+++
4-(Phenylsulfonyl)morpholine $C_6H_5SO_2N(CH_2)_2O(CH_2)_2$	125	3.0	1.9	+++
N,N-Dimethyl-N'-piperonylidene-p-phenylenediamine $CH_2O_2:C_6H_3CH:NC_6H_4N(CH_3)_2$	188	2.7	1.1	+++

Table 1.--Continued

Compound	Larvae used in treatment 1/	Average mortality of larvae		Amount of feeding 2/
		Treated	Not treated	
	Number	Percent	Percent	
Tests at 4 pounds per 100 gallons - Cont.				
4,4'-Dichlorobenzophenone oxime $(C_6H_4Cl)_2C{:}NOH$	113	2.6	.6	+++
p-Methylacetophenone oxime $CH_3C_6H_4C(CH)_3{:}NOH$	68	2.4	2.1	+++
1-Benzoylurea $C_6H_5CONHCONH_2$	153	2.4	1.7	+++
N-Isobutylcinnamide $C_6H_5CH{:}CHCONHC_4H_9$	158	1.9	.0	+++
N'-Benzylidene-N,N'-dimethyl-p-phenylenediamine $C_6H_5CH{:}NC_6H_4N(CH_3)_2$	166	1.8	1.1	+++
Cyclopentanone oxime $CH_2(CH_2)_2CH_2C{:}NOH$	81	1.6	4.8	+++
2-Furaldehyde 4-phenyl-3-thiosemicarbazone $(C_4H_3O)CH{:}NNHCSNHC_6H_5$	190	1.6	1.7	+++
Salicylaldoxime $C_6H_4(OH)CH{:}NOH$	111	1.4	2.1	+++
1-Phenyl-3-(phenylthioureido)-2-thiourea $(C_6H_5NHCSNH-)_2$	185	1.4	1.7	+++
Ethylideneurea $CH_3CHNHCONH$	180	1.2	.7	+++
2-Furanacrolein 4-phenyl-3-thiosemicarbazone $(C_4H_3O)CH{:}CHCH{:}NNHCSNHC_6H_5$	175	1.1	1.7	+++
4-(1,2-Dibromoethyl)toluene $CH_3C_6H_4CHBrCH_2Br$	100	1.0	.7	+++
4-Phenylmorpholine $(C_6H_5)N(CH_2)_2O(CH_2)_2$	119	.8	1.9	+++
2,5-Bis(p-methylphenoxy) 1,4-cyclohexanedione $CH_3C_6H_4OCHCOCH_2CH(OC_6H_4CH_3)COCH_2$	172	.8	1.7	+++

Table 1.--Continued

Compound	Larvae used in treatment 1/	Average mortality of larvae		Amount of feeding 2/
		Treated	Not treated	
	Number	Percent	Percent	
Tests at 4 pounds per 100 gallons - Cont.				
Benzaldehyde 4-phenyl-3-thiosemicarbazone $C_6H_5CH:NNHCSNHC_6H_5$	157	.7	1.7	+++
N-p-Tolylcinnamamide $C_6H_5CH:CHCONHC_6H_4CH_3$	169	.5	.0	+++
Cinnamanilide $C_6H_5CH:CHCONHC_6H_5$	189	.5	.0	+++
N-o-Tolylcinnamamide $C_6H_5CH:CHCONHC_6H_4CH_3$	190	.0	.0	+++
Cinnamamide $C_6H_5CH:CHCONH_2$	183	.0	.0	+++
Tests at 2 pounds per 100 gallons				
4,6-Dinitro-o-cresol ethyl ether $(NO_2)_2(CH_3)C_6H_2OC_2H_5$	110	100.0	.3	0
Ethylidenebisbenzamide $CH_3CH(NHCOC_6H_5)_2$	147	93.1	2.5	0
Salicylaldehyde 4-phenyl-3-thiosemicarbazone $C_6H_4(OH)CH:NNHCSNHC_6H_5$	50	14.0	2.5	++ to +++
d-Camphor oxime $C_{10}H_{17}NO$	83	6.7	2.1	+++
Cinnamaldehyde 4-phenyl-3-thiosemicarbazone $C_6H_5CH:CHCH:NNHCSNHC_6H_5$	70	1.4	2.5	+++
1-Benzoylthiourea $C_6H_5CONHCSNH_2$	75	1.3	2.5	+++
4-Phenylthiosemicarbazide $C_6H_5NHCSNHNH_2$	77	1.3	2.5	+++
Tests at 1 pound per 100 gallons				
4,6-Dinitro-o-cresol ethyl ether $(NO_2)_2(CH_3)C_6H_2OC_2H_5$	211	100.0	.3	0
Ethylidenebisbenzamide $CH_3CH(NHCOC_6H_5)_2$	78	14.1	1.5	+++

1/ Approximately the same number of larvae were used in the nontreated tests.

2/ 0, none; +, little; ++, moderate; +++, much.